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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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| 09/322,666 | 05/28/99 | FUGLEVAND P.E. W | WA23-015 |

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| EXAMINER | |
|---|---|
| KALAFUT,S | |
| **ART UNIT** | **PAPER NUMBER** |
| 1745 | 4 |

**DATE MAILED:** 10/04/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

| Application No. | Applicant(s) |
|---|---|
| 09/822666 | FUGLEVAND ET AL |
| **Examiner** | **Group Art Unit** |
| KALAFUT | 1746 |

*—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

**Status**

☒ Responsive to communication(s) filed on 10/12/99 AND 6/12/00.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

**Disposition of Claims**

☒ Claim(s) 1-262 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) See BODY OF ACTION is/are allowed.

☒ Claim(s) see BODY OF ACTION is/are rejected.

☒ Claim(s) See BODY OF ACTION is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement.

**Application Papers**

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119 (a)-(d)**

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received: _____.

**Attachment(s)**

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 23

☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other _____

**Office Action Summary**

**1.** The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

**2.** Claims 1-4, 7, 18, 51, 53, 54, 56, 58, 68, 70, 71, 73, 75, 77, 88, 90, 91, 130-132, 134, 152, 154, 155, 158, 200, 202, 203, 209, 211 and 214 are rejected under 35 U.S.C. 102(e) as being anticipated by Grot *et al.* (US 6,001,499).

Grot *et al.* disclose a stack of polymer electrolyte fuel cells which are monitored and controlled in response to the level of CO in the fuel, which is related to their voltage output. The controlling is performed by a data processor, which would be digital, into which data may be input (column 10, lines 12-18). The controller thus includes an operator interface. The CO level is monitored by a sensor. Since this level is related to voltage, the sensor would indirectly detect an electrical condition of the fuel cell stack. The stack also includes a fuel injector, which would correspond to the present "main valve". While not explicitly mentioned, the stack would have terminals at its ends.

**3.** Claims 1-4, 68, 130-132, 152, 155 and 209 are rejected under 35 U.S.C. 102(b) as being anticipated by Takabayashi (US 5,023,150).

Takabayashi discloses a fuel cell stack which is monitored and controlled by a controller (11) which includes a memory unit, in response to the power output of the stack. The supplying of fuel into the stack is controlled (figure 8, step S1).

**4.** Claims 1-3, 16, 24, 39, 42, 46-48, 68, 71, 74, 130-132, 143, 144, 168, 171, 176-178, 200, 203 and 207 are rejected under 35 U.S.C. 102(b) as being anticipated by Cheiky (US 4,913,983).

Cheiky discloses a battery of metal-air cells (a type of fuel cell) with a fan (26) which is controlled by a computer (which would be digital) in response to the power output of the battery. The battery also includes a device (22) for permitting or stopping the entrance of air. Each of the cells would constitute a cartridge. The space for the air inside the battery housing (12) would be a plenum, which directs the air to the cathodes of the cells.

**5.** Claims 1, 2, 4, 130, 132, 168, 171 and 176 are rejected under 35 U.S.C. 102(b) as being anticipated by Doyle *et al.* (US 3,553,023).

Doyle *et al.* disclose a fuel cell, which may comprise a plurality of individual cells (column 5, lines 28-31), where the directing of air thereinto is controlled by a timer (60).

**6.** Claims 1-4, 7, 130-132, 134 and 141 are rejected under 35 U.S.C. 102(b) as being anticipated by Christianson (US 3,432,356).

Christianson discloses a fuel cell with an polymer electrolyte membrane, and a digital controlling system, which monitors the current via a sensor (52). In response to the current, the system controls the temperature of the fuel cell via a temperature control unit (68), thus keeping

the temperature within an acceptable range. Although only one fuel cell is shown, groups of interconnected cells may be used (column 4, lines 9-11).

**7.** Claims 32, 34, 35, 37 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by DuBose (US 6,013,385).

DuBose discloses a fuel cell including a purge vent (96) which is periodically open to the atmosphere. The vent purges hydrogen from the anode flow path, and is controlled by a computer, which would be digital. See column 8, lines 11-20.

**8.** Claims 1, 2, 130, 132, 168 and 176 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Sonntag (US 5,877,600).

Sonntag discloses a fuel cell with an air input which is controlled by a drive control, which may be digital (column 3, lines 26-28). This would control the electrical output of the fuel cell. The air would be directed to the cathode of the fuel cell.

**9.** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**10.** Claims 39, 41, 44, 57, 93, 143, 181, 183, 184, 187, 188, 190 and 206 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grot *et al.*, above.

Grot *et al.* do not mention a human perceptible signal or indication, nor a fan used to feed air into their fuel cell. Signals which humans may perceive, however, would be conventional where a data processor is used, in order for human operators to know what is being done by the processor. Fans used to blow are conventional in the fuel cell art, and other arts involving air movement. These claims would thus be obvious over Grot *et al.*

**11.** Claim 214 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takabayashi.

Takabayashi do not mention a main valve for his fuel supply input. The use of valves to permit or stop gases from entering a device where they are used, however, is conventional is the fuel cell art. This claim would thus be obvious over Takabayashi.

**12.** Claims 49, 50 and 175 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheiky.

These claims differ from Cheiky by reciting an output signal from the controller, or that the controlling is done is response to the monitored value of the voltage or current from the fuel cell. Signals which humans may perceive would be conventional where a computer is used to control a device. Since Cheiky teaches that the power output is monitored, it would be within the skill of the artisan to select an appropriate electrical parameter. These claims would thus be obvious over Cheiky.

**13.** Claim 142 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christianson.

This claim differs from Christianson by numerically reciting a temperature range for the operation of a fuel cell. Since the effects of temperature on fuel cells would be well known to the

ordinary fuel cell artisan, determining an optimal range of temperature would be within the skill thereof. This claim would thus be obvious over Christianson.

**14.** Claims 16, 39, 42, 45, 143, 170 and 177 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonntag.

These claims differ from Sonntag by reciting a fan for directing air, rather than a compressor, or by reciting the polymer electrolyte type of cell. Fans are well known air-moving devices. Polymer electrolyte cells are conventional in the art. For these reasons, these claims would be obvious over Sonntag.

**15.** The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**16.** Claims 110, 112, 113, 115 and 241, 243-247, 249 and 251 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 6,096,449. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present switching device which shunts a least one

fuel cell in a stack thereof would be encompassed by the controller, of the patented claims, which shunts current between the electrodes of a fuel cell.

**17.** Claims 123, 125-128, 130, 148, 252, 254-257 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 32-73 of U.S. Patent No. 6,096,449. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present claims recite a switching device and controller which couple the fuel cell(s) with a terminal. This would encompass the system in the patented claims, where a switch mounted between the anode and cathode is operated by a controller. The locations where the patented switch could be placed would include a place between one electrode and a terminal.

**18.** Claims 59-67, 79, 145, 146, 159-167, 174, 191-199, 215 and 216 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 59 and 191 recite the supplying of electricity, but not the place where it is supplied. Claim 145 is confusing because auxiliary valves, but no main valve, is recited. Claims 79, 146, 215 and 216 recite main and auxiliary values, but nót any fluid flow connection between them. The term "exhausting a connection", in claim 159, is confusing. There is no antecedent for "the monitoring" in claim 174.

**19.** Claims 25-31, 80-87, 98-109, 217-240 and 259-262 are allowed. The prior art does not disclose, nor does applicant's previous patent claim, the fuel cell with a plurality of controlled valves; a fuel cell with an air temperature modifier within its housing; a fuel cell with a

temperature sensor in its housing, with a controller to monitor the temperature; a fuel cell with a housing in which the presence of fuel in the space about the cells is monitored; or a method of fuel cell operation where the temperature in its housing is monitored and adjusted, and in response to which the fuel cell is connected to a power bus.

**20.** Claims 5, 6, 8-15, 33, 36, 40, 43, 52, 55, 69, 72, 76, 78, 89, 92, 94-97, 111, 114, 116-122, 124, 129, 133, 135-140, 147, 149-151, 156, 157, 169, 172, 179, 180, 182, 185, 186, 189, 201, 204, 205, 208, 210, 212, 213, 242, 248, 250, 253 and 258 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose, nor does applicant's previous patent claim, the control system with a plurality of distributed controllers, the fuel cells in a stack being able to be selectively deactivated, the plurality of shunting switching devices, the air temperature sensor and control assembly within a housing about the fuel cells, the fuel cell with a hydrogen gas sensor as the fuel sensor (Grot *et al.* disclose a CO sensor), a fuel cell stack with a plurality of controlled valves, a fuel cell with a fuel sensor and a heating device for the sensor, a fuel cell stack with a switching device for each cell, the deactivation or selective shunting of controlled fuel cells within a plurality thereof, the remote device communicating with a controlled fuel cell, the shutdown in response to monitoring the presence of fuel about the fuel cells, the fuel cell in which the air temperature is monitored while its being directed is controlled, shunting a fuel cell after it is monitored, or shunting of fuel cells in sequence or a specified order.

**21.** The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

**22.** Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Steve Kalafut whose telephone number is (703) 308-0433, and who is acting as a supervisor. Another acting supervisor, examiner Carol Chaney, may be reached at (703) 305-3777. The Technology Center receptionist may be reached at (703) 308-0661.

STEPHEN KALAFUT
PRIMARY EXAMINER
GROUP 1700

sjk

September 28, 2000